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ABSTRACT

This paper describes a method for accelerating educational improvements nationwide through the activities of one or more catalyst organizations which would stimulate interaction between educational systems personnel and promising new ideas. It highlights measures to correct present shortcomings that exist because there is no strong linkage between the educational researcher and the practitioner. The paper discusses the nature of an educational researcher and the reasons why innovations in this field frequently fail, the necessary components of an educational catalyst organization, and the various activities which can be projected for such an organization. It synthesizes findings on change and innovation to posit guidelines for training, for personnel management, and for support functions within a catalyst organization, and it urges assumption of the catalyst role by the extent Regional Laboratories or some other innovative structure. The paper acknowledges that much research has been done in this general substantive area, but indicates that little specific action has been taken as a result. It thus recommends that such action be taken at this time. A 39-item bibliography and appendixes are included. (This paper was previously cited in the August 1972 issue of RIE as ED 061 991.) (Author)

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THE EDUCATIONAL CATALYST: AN IMPERATIVE FOR TODAY

Occasional Paper 10

by

Joe H. Ward, Jr.
Reeve Love
George M. Higginson

Southwest Educational Development Laboratory
Austin, Texas

July 1971

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INTRODUCTION

One of the purposes of the Phi Delta Kappa Research Service Center is the improvement of understanding of the research process on the part of members of Phi Delta Kappa and other interested persons. Among the activities engaged in to achieve this purpose is the publication of the OCCASIONAL PAPER series. The series serves as a vehicle whereby writings on or related to the research process may be made generally available. Of particular interest are manuscripts which journals are not likely to publish due to length.

Ward, Love, and Higgison are involved in efforts to improve the operation of educational institutions. Their experiences in this work delineate the need for educational catalysts to effect institutional change. This paper documents that need and suggests ways of meeting it.

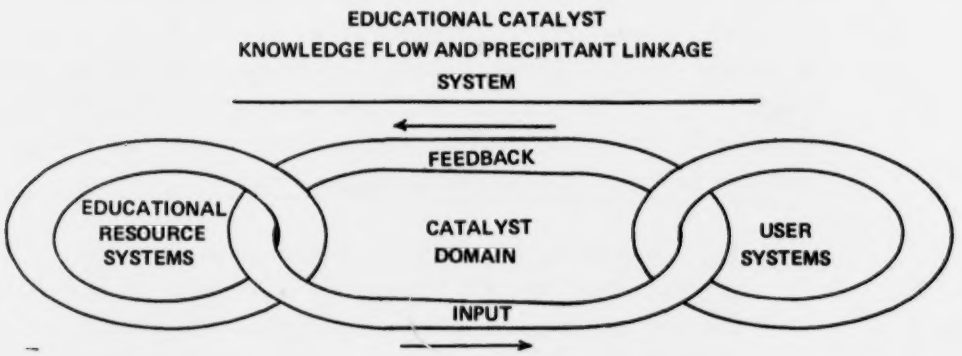
William J. Gephart
Director of Research Services
Phi Delta Kappa

Dr. Ward (16F, San Antonio Chapter) was a senior systems analyst for the Southwest Educational Development Laboratory in Austin, Texas, and is presently with the Air Force Human Resources Laboratory at Brooks Air Force Base, Texas; Mr. Higginson is the Director of the Division of Contest Analysis and Planning at the Southwest Educational Development Laboratory, and Miss Love is a technical writer/editor there.

The opinions expressed in this paper are those of the authors. They do not necessarily reflect the views, policies, or opinions of the Southwest Educational Development Laboratory or of its basic funding source, Elementary and Secondary Education Act, Title IV, U.S. Office of Education, or its other funding sources, nor of the Human Resources Laboratory.

ABSTRACT

This paper describes a method for accelerating educational improvements nation-wide through the activities of one or more catalyst organizations, which would stimulate interaction between educational systems personnel and promising new ideas. It highlights measures to correct present shortcomings, which exist because there is no strong linkage between the educational researcher and the practitioner. The paper discusses the nature of an educational system, the reasons why innovations in this field frequently fail, the necessary components of an educational catalyst organization, and the various activities which can be projected for such an organization. It synthesizes findings on change and innovation to posit guidelines for training, for personnel management, and for support functions within a catalyst organization, and it urges assumption of the catalyst role by the extant Regional Laboratories or some other innovative structure. The paper acknowledges that much research has been done in this general substantive area, but indicates that little specific action has been taken as a result. It thus recommends that such action be taken at this time.



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I. Introduction

Consider the changes, for better and for worse, that have come about in our world in the last century, or even in the last decade. Man has walked on the moon. Surgeons are transplanting human hearts. In many countries, the megalopolis has become a reality, and attention has turned to the unique lifeways and the peculiar stresses of the city. Population growth has become a threat rather than a goal. Ecology, and the belated attention that must be given it if we are to continue on this planet at all, are vital and global concerns.

Changes have occurred at such an accelerating rate that it is hard for the individual to adjust to them all. The only way for him to learn to make these adjustments is through an education that is responsive to change, that incorporates improvement; and education today is not improving as fast as it might. Of our areas of endeavor, it has received the least updating.

Research has shown that it takes a generation at best for an educational innovation to enjoy widespread use. If this is indeed the case, then our schools are only now receiving the benefits of what was deemed innovative in 1930. What can be done to make education more meaningful for the 1970's and beyond? How can we bring about optimum changes and make the greatest improvements? And how can we get the human beings who must implement these changes and improvements to accelerate the process?

According to Chase, the principal problem involves bridging the gap between theory and practice.

> The building of organizational links to facilitate the flow of knowledge into educational practice is going forward slowly but persistently. Education not only suffers from inadequate knowledge-producing resources, but also from the lack of closely linked agencies for moving knowledge through essential processes and phases to widespread and effective use.[1]

Among the "knowledge-moving" agencies that do exist are the United States Office of Education sponsored Research and Development Centers and Regional Laboratories. Chase summarizes his observations about these organizations in this way:

> . . . the centers and laboratories are beginning to make contributions to such processes as (1) elaboration to reveal implications of research findings, (2) codification to show relationships among empirical and other data, (3) application to problems encountered in practice, (4) incorporation into products and technologies for educational use, (5) reconciliation of the new processes and products to retained elements (or other approaches to compatible functioning), (6) testing to demonstrate effects under a variety of controlled or closely observed conditions, and (7) continuing infusion of new knowledge and modification of products and processes to meet newly identified needs.[2]

He goes on to describe the problem of bridging the gap between the conception of good ideas for improving educational systems and the operational use of these ideas in a real-world educational setting.[3] It is this problem of infusion of innovative ideas, or acceleration of educational improvements, that is the primary concern of this paper, and it is here that our greatest difficulties have been.

> Perhaps, the state of affairs relative to the origination, legitimation and communication of innovations in education is illustrated by the state of knowledge and validated practice in the teaching of reading by Barton and Wilder- - - They conclude that an ideal model for originating, disseminating, and validating innovations in reading would include:
>
> 1. Highly trained researchers making sustained efforts to solve basic problems in the field
> 2. High interaction between these researchers and those in basic sciences which might aid them
> 3. Research findings which are cumulative
> 4. Changes in materials and methods based on these findings
> 5. Feedback about special problems from teachers to researchers and publishers, leading to further research and changes in materials and in methods

Instead they found that:

1. Reading researchers are largely untrained, and are doing part-time one-shot research.
2. Contact with other disciplines is infrequent.
3. Research is voluminous, but of poor quality and noncumulative.
4. Materials are largely uniform, unchanged and uninfluenced by new research since the 1930's.
5. Teachers depend largely on published materials, and though ideologically committed to professional behavior, are unable to practice it as traditionally defined.[4]

A great deal of knowledge concerning appropriate strategies and processes for effecting desirable educational change is readily available; what is needed now is the motivation and impetus to actually bring about such change.

If the infusion of ideas is visualized as a process similar to a chemical process, it becomes apparent that this is a process which requires a catalyst for optimum results. While an educational community may have available to it any number of good ideas – effective instructional systems (products), new educational management techniques, principles of good instruction, etc. – it is still necessary to create within the community the proper atmosphere for ensuring the implementation of these ideas. Some element must be introduced into the system which will create such an atmosphere, and which will cause accelerated educational improvement. This element would be, in effect, an educational catalyst, and would stimulate the interaction between educational systems personnel and new ideas to produce the more rapid improvement desired.

Professional catalysts, or change agents, have been used with considerable success in a number of fields. Over the past few decades agricultural agents have brought about drastic changes, and vast improvements, in methods of farming around the world, with particularly spectacular and measurable results in the United States. Missionaries in the Middle East have contributed greatly to the modernization of the Arab countries and to their utilization of their rich oil resources. In the area of preventive medicine,

planned campaigns have led to widespread immunization against numerous diseases and to the control of such potential health hazards as the anopheles mosquito. Surely similarly great improvements can be anticipated in education if equal thought and effort are given to implementing and optimizing the change process, and to effecting the shifts in attitude that are necessary to bring about lasting improvements.

The act of planning and implementing a change in an educational system can be a simple or a complex process. Most students of this behavior use the word "practice" to describe the process, and organize the practices into categories according to their complexity.

Beal and Bohlen[5] delineate four categories, the simplest of which is a *change in materials and/or equipment.* A change in textbooks or in specific curriculum content would be a typical case.

The second category is an *improved practice,* which involves a change in techniques or methodology. Using filmstrip instead of chalkboard, with no change of content, is an illustration.

The third category of complexity is an *innovation.* This category involves not only a change in materials, but also a sequence of changes in their use. The introduction of computer-assisted instruction in the classroom would probably best illustrate this practice.

Finally, the fourth category is a *change in enterprise,* which involves several innovations. The introduction of early childhood education in a school that previously started with the first grade would be an example of a change in enterprise.

The differences in their meanings notwithstanding, the terms explained above are used loosely in this paper. In most instances we refer to change, to innovation, or to techniques and methods in a general way, and do not try to make distinctions among the four categories of complexity.

The organization which, in the role of educational catalyst, undertakes to stimulate improvements of any nature must study carefully the particular environment in which it will work, and must bring into this environment a wide range of information. It cannot be committed to a single idea, or a single set of ideas, but must seek to bring together the right people and the relevant ideas at the right place and time.

At present, some of the Research and Development Centers and the Regional Laboratories are performing catalytic activities, but in a rather limited manner. If any of these organizations, or any other organization, were to focus its attention specifically on such activities, acting as a conscious agent for desirable change, it could bring about dramatic and stirring educational improvements within its area. The rest of this paper will discuss the catalytic role in education, and the various courses an organization may take when it opts to assume this role.

II. Today's Educational System

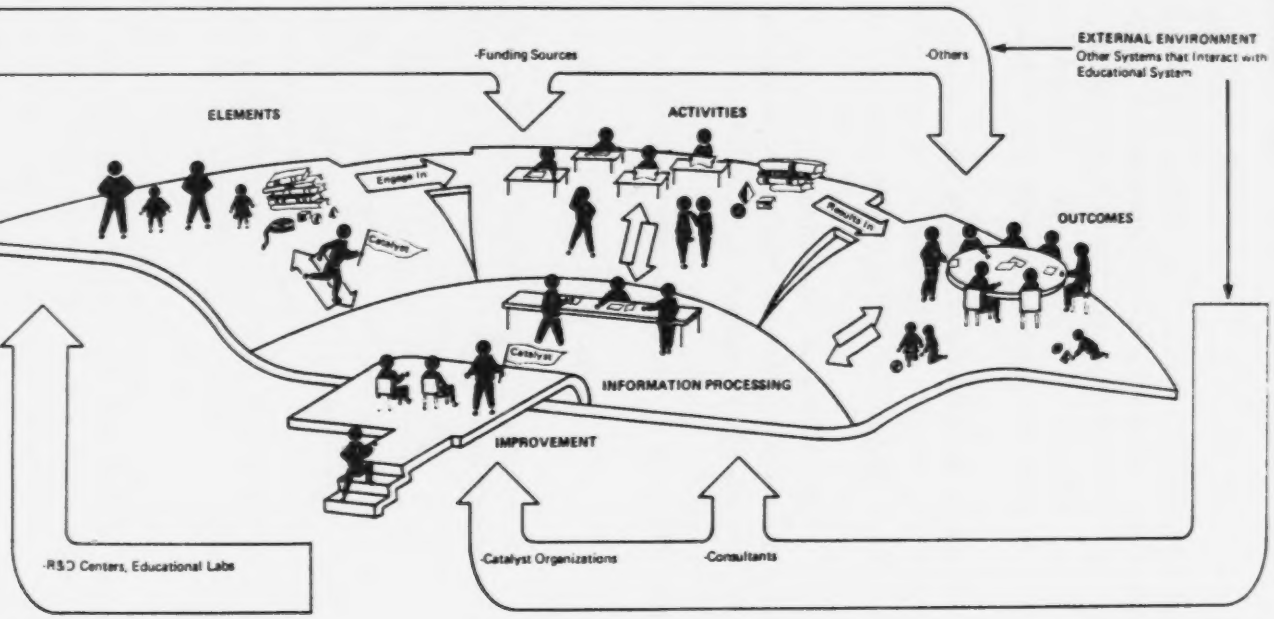
To ensure that communications are good and that there is no misunderstanding about this paper's recommendations, it is desirable at this point to describe briefly the authors' conception of the present educational system. The description will treat only the most relevant components, without details.

The following paragraphs refer to Figure 1, which is a pictorial representation of an educational system. (See also Appendix A for a schematic representation with greater detail.)

Elements. The elements comprise learners, teachers, administrators, parents, and the books, buildings, films, and other materials pertaining to the educational system. The elements are the people and materials (resources) about which decisions must be made, and which are involved in activities that produce outcomes.

Activities. The activities consist of all the relevant, describable actions in which elements can engage. Such activities as reading,

FIGURE 1
COMPONENTS OF AN EDUCATIONAL SYSTEM



(See Appendix A. page 44, for a schematic representation of an educational system.)

writing, inquiring, discussing, etc. are carried out by the elements.

Desired Outcomes (or Objectives). The educational system has objectives which it endeavors to attain. When the elements engage in activities, the results are outcomes which may or may not match the specific objectives. The objectives may vary from fuzzily described goals such as "obtain optimum individual development" or "attain social competence" to clearly described behaviors in reading, writing, computing, etc. The more clearly the objectives are described, the easier it is to determine the extent to which the outcomes meet the objectives.

Information Processing. The information processing components involve the vast subsystem for storage, retrieval and analysis of information that is the heart of the educational system. This subsystem includes the predictions that are required to estimate the effects of alternative activities, the consideration of constraints under which decisions must be made, and the choices to be made from many alternatives (decision-making). It also includes the comparison of actual outcomes with desired and predicted outcomes to provide the feedback required for controlling the system and for improving it. The arrows leading in and out of this component represent the information flow among all components as well as the information flow to and from the environment.

External Environment. The external environment, both physical and attitudinal, is shown outside of the educational system. It comprises everything that influences or interacts with the educational system, including funding sources, consultants, R & D Centers, Regional Laboratories, pressure groups and other individuals and organizations both inside and outside the field of education.

Improvement. The improvement of an educational system is extremely important and probably is the most neglected of all its components. It is represented as both an internal and an external factor in the depiction of the system. Improvement may be generated by employees, students or other members of the

system, or it may come through pressure from an outside agency or group. Thus, the educational system has a built-in improvement component. Typical improvement activities are: reorganization of the elements and activities, cost-benefit analysis, staff training, updating the desired outcomes, improving prediction, modifying the activities of the system, etc.

Some difficulties with the improvement component may arise through the fuzziness of educational objectives, the inadequacy of feedback information on predicted and observed situations, and the general tendency to equate suggestions for improvement with negative criticism of the system. Improvement must be continuously solicited and considered, so that the occurrence of traumatic events can be avoided. The improvement component should be recognized as both a necessary and a desirable feature of any system.

Educational Catalyst. The educational catalyst must cause interaction between the human elements of the operational system, its improvement component, and the external environment, in order to accelerate the improvement of education. The catalyst function may be performed by one person interacting in several different ways or by several persons focusing on a specific situation.

Catalytic actions toward improvement can occur in many ways. A catalyst can be a consultant from the external environment, a teacher within the operational system, a supervisor concentrating on educational improvement, or even a parent who happens to stimulate something good in the schools.

The study of how past improvements have been made should be used as a starting point for defining catalytic activities. Studies such as those being done by the Kettering Institute for the Development of Educational Activities (I/D/E/A) might be helpful in clarifying the description of the catalyst organization. But it is not sufficient simply to study the ways in which changes have taken place. Further actions are needed. Educational catalysts must be identified, nurtured, and infused into educa-

tional systems to greatly accelerate the improvement of education.

If an Educational Catalyst Organization is to attain maximum success, it is necessary to describe at the outset the elements, activities and objectives and the related information processing functions. In discussing the systems development role of the Regional Laboratories, Chase has specified the importance of having goals, strategies, and built-in processes and mechanisms for the continuing evaluation, modification, and adaptation of products and systems.[6] Any effective system must have built-in feedback to insure desired results, and an organization designed to promote linkage activities should follow Chase's approach to insure the necessary evaluation, modification, and improvement of these activities. The specific components and functions of a catalyst organization will be discussed in greater detail later in this paper.

III. Why Innovations Fail

In the late 1960's the United States was spending more on education – about $70 to $75 billion a year total – than on defense. There are now over 61 million Americans involved in education. Teachers are the largest single occupational group of the American labor force. By virtue of these facts, and others, education is undoubtedly the largest U.S. industry, and it is forecast to account for one half the Gross National Product by the late 1970's.[7] Yet this giant is slow-moving: while the last decades have produced unbelievable advances in technology, economics, science, engineering and other fields, the improvements in education have been negligible. Why?

> It is somewhat paradoxical that faith in education is at an all-time high, if we may judge by the miracles it is asked to perform; while confidence in the schools may be at an all-time low, if we may take at face value the protests of students, minority groups, and teachers, or the criticisms which deluge the professional as well as the popular media. Another paradox is the chorus of acclaim for new tech-

> nologies and other innovations and the accompanying wails of disillusionment as one innovation after another falls short of realizing the hopes built upon it.[8]

Too many schools have storerooms chock full of textbooks, machines, films, and gadgets which were once thought of as the ultimate in technology, and which were going to solve all the schools' problems. Each of these had a purpose, each had a meaning, each should have made an improvement, and, for reasons not well understood, each failed. Could the industrial complex that produced these wonders be so wrong? Probably not. Given reasonable opportunity to succeed and allotted the correct proportions of time, energy, and other resources, most of these innovations would have caused some improvement in the learning process and would have been retained as part of the curriculum.

If random contacts were made with personnel from elementary schools around the country, many of them would present a favorable impression in conversing about innovation. They know about and understand innovative things and, in fact, will explain that their own philosophy is to be innovative and to foster new and improved ideas and practices. However, an examination of the curricula and actual teaching methods in most of these schools will show the same old thing: adults who compare the school situation, overtly or covertly, to that of their own childhood, and large classrooms of children who progress in a lock-step manner, who don't like school, and who find it an entirely different world from their own real-life worlds.

> Seers of bygone decades occasionally asked whether our schools had outlived their usefulness – and we laughed. The question is no longer funny. The schools are conspicuously ill-suited to the needs of at least 30 per cent of their present clientele: the large number of children from minority groups who live in harsh environments; the tens of thousands who suffer from crippling mental, physical, and emotional handicaps; and a few whose rare gifts separate them sharply from their peers. But the lack of "fit" between school and client extends into other realms until one is forced to ask whether our educational system serves

> even 50 per cent of its clientele in reasonably satisfying ways.[9]

Part of the problem created by technology and innovation is that the merchants of these products frequently tend to oversell them. The innovations are described as having been field tested when, in fact, the economics of marketing do not permit time for proper field testing, and the direct results or the side effects of the products may be far from anything known or even anything desirable. Furthermore, these same products are generally reported usable for many more purposes, or in many more situations, than will actually be the case. In short, if the products' shortcomings were known in advance, and if their use was planned in proper proportion to that of other learning systems, the results would probably be considerably more successful.

Another cause for rejection of innovations is their disruption of the orderly, not to say fossilized, pattern of ongoing classroom activities, especially if the innovations are themselves less structured than these activities. It appears that, regardless of anything else, control must be maintained.

> Because adults take the schools so much for granted, they fail to appreciate what grim, joyless places most American schools are, how oppressive and petty are the rules by which they are governed, how intellectually sterile and aesthetically barren the atmosphere, what an appalling lack of civility obtains on the part of the teachers and principals, what contempt they unconsciously display for children as children. . . .The solution must lie in infusing the various educating institutions with purpose; more important, with thought about purpose, and about the ways in which techniques, content, and organization fulfill or alter purpose. . . .Students need to learn far more than the basic skills. . . .[but] The most important characteristic that nearly all schools share is a preoccupation with order and control.[10]

The result of this preoccupation is that a major part of the teacher's time and energy is devoted to keeping records, acting as traffic manager, and time keeping. And a further result is that the

children's time is wasted in standing in line, doing needless chores, and becoming increasingly bored.

Still another reason for failure in educational innovation is that educators frequently are not good planners, and they often fail to consider the "systems problems" in planning or programming new curricula, methods, or facilities. A new procedure, book, or piece of equipment may require extensive teacher and administrative staff orientation, some parental training, community understanding, and probably considerable explanation to the student. But this is only the beginning of the problem. There will also be questions about when these people are to be involved, how much they should be involved, the cost of their involvement, and the need for general scheduling and inter-meshing of all these factors on a time table and budget sheet.

> . . .[the new educational R & D operations] reflect a conviction that significant gains in the quality of education usually require the development of compatible systems in which all elements work together for the desired effects.[11]

This is another way of saying that if reasonably progressive steps are to be taken, change doesn't just happen; it requires organizing. It must be planned by people who are trained and expert in all aspects of planning for improvement. It has to be studied beforehand with regard to the environment in which it is to take place, so that the planning can be tailored to the local situation. Improvements, and the rationale behind them, have to be sold to many people on an individualized basis, since any change creates conflict within and around a school. An innovation must be explained to the people who will be involved with it both directly and indirectly; it must be tried out in a pilot stage; and it may have to be reshaped and re-explained before it is finally carried out in full. No innovation can be implemented successfully without a widespread understanding of the attitudes related to it and of the psychological impact it may have.

> Education is a process of producing change in individuals. Schooling usually seeks rather specific changes. Perhaps the most significant contribution to be made by a science of

> education would be to reveal the relative weights to be accorded various factors contributing to educational change.[12]

Thus, piece-meal change and one-step innovation are likely to be treated as a brush fire, and put down. The only route to a successful kindling of far-reaching improvement is through the professional catalytic agent who knows how to plan for and implement a total effect.

> **Change Orientation.** The most popular starting point of those seeking educational improvement has been with people, not with products. Education is considered a distinctly human enterprise, therefore, the route to educational improvement is to change human relationships. If one starts here, he finds a corpus of psychological and sociological research relevant to what is referred to as planned organizational change . . . .
>
> The key elements of the process are the conditions surrounding the relationship and the nature of the operable knowledge the change agent can draw upon. The conditions which should be met are summarized by Bennis as follows:
>
> (a) a joint effort that involves mutual determination of goals;
> (b) a 'spirit of inquiry' – a relationship that is governed by data publicly shared;
> (c) a relationship growing out of the mutual interaction of the client and the change agent;
> (d) a voluntary relationship between change agent and client, with either free to terminate the relationship after joint consideration.
> (e) a relationship where each party has equal opportunities to influence the other.[13]

Personnel involved in linkage activities should be aware of the necessity for meeting these conditions, and of the kinds of problems they are likely to encounter, so that their change efforts can be as fruitful as possible.

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IV. Components of an Educational Catalyst Organization

The function of a successful educational change agent, or catalyst, is to bring about acceleration of improvements in the field of education. Any organization concerned with performing this particular function can thus be termed an Educational Catalyst Organization (E.C.O.), operating as an open system which interacts with other educational systems.

> Change creates conflict within and around a school. Initially, such conflict – between principal and his school board or superintendent, between principal and teachers, between groups of teachers, and between school and community – is unavoidable and may even be desirable. Ultimately, however, the principal must learn to translate the energies of these conflicts into a constructive force.[14]

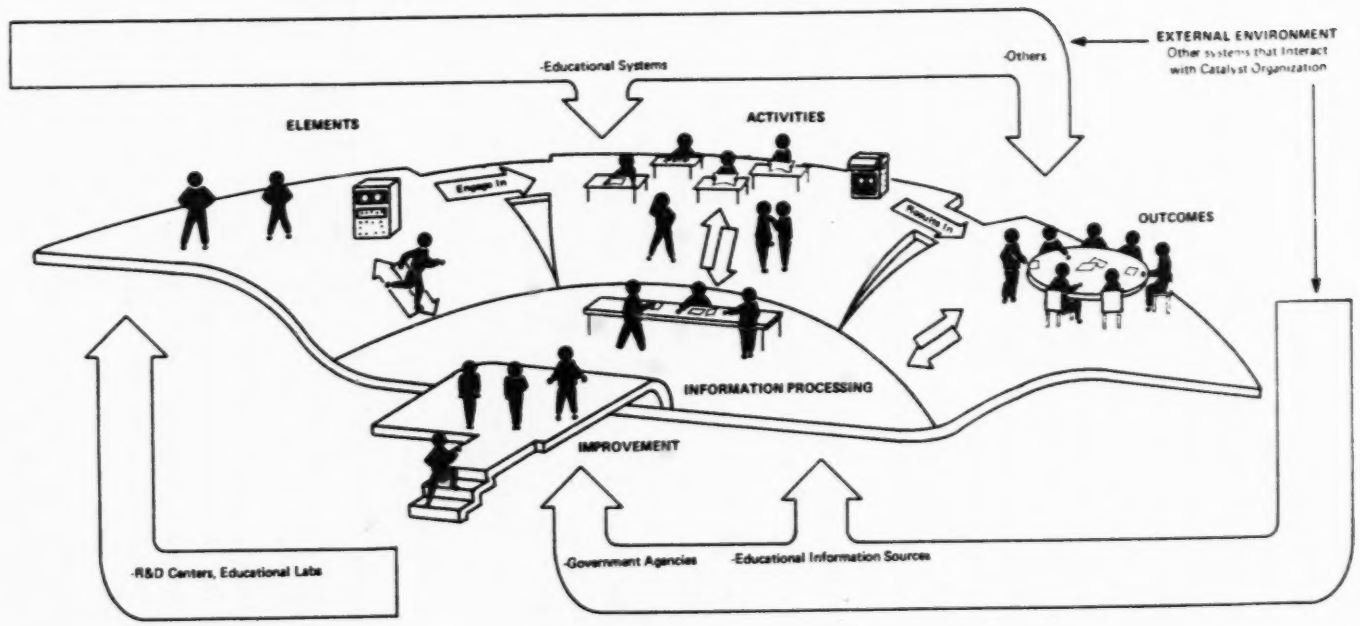
Here, the E.C.O. can be of considerable help to the schools. Improvement, and the necessity to adapt to the changes it entails, create considerable stress and conflict within an individual or an organization, and for this reason the instigation of improvement must be approached with psychology and tact. However, few positive actions are accomplished without the application of a certain amount of stress. The role of the catalyst organization is to strike a balance between that degree of pressure which starts to set things in motion and that degree which renders the recipient all but catatonic. In each situation, therefore, the catalytic function will be performed somewhat differently, and each E.C.O. will evolve its own elements and activities and interrelations between them.

The E.C.O. structure will be essentially the same as that of any other educational system. It is appropriate here to define only the fundamental properties of an E.C.O. and avoid "over-prescription" of the organization. The following paragraphs refer to the components of a catalyst system as depicted in Figure 2. (See also Appendix B for a more detailed, schematic representation.)*

*It should be noted that catalysts will be operant within the E.C.O. itself as they are within any educational system. To avoid unnecessary confusion, however, the catalyst components have been omitted from the depictions of the E.C.O.

FIGURE 2

COMPONENTS OF AN EDUCATIONAL CATALYST ORGANIZATION (OR SYSTEM)



(See Appendix B, page 45, for a schematic representation of a catalyst system.)

Elements. The catalyst *personnel* assigned to work with educational systems for acceleration of improvement will be drawn from teachers, administrators, parents, and others, and will have a wide range of talents. There will be generalists with broad liberal arts backgrounds and wide experience in education, and there will be specialists in administration, curriculum, evaluation, data processing, etc. The demand for particular talents will vary according to the real-life situations within which the E.C.O. operates, and personnel requirements can be better defined as the organization's experiences are recorded and analyzed by its information processing system. Special job titles should not be assigned until a considerable backlog of experience has been accquired. Titles can have a significant impact on morale, and the early adoption of incorrect titles would be unfortunate.

Other personnel will be required to provide financial, marketing and information processing capabilities for the E.C.O.

The *materials* used by the catalyst organization will include books, films, audiotapes and videotapes, and other media as appropriate. Demonstration schools should also be available for use as innovative materials and techniques are presented to potential users. The E.C.O. must have a *continuing supply of information* about instructional systems in general, educational management techniques, and any new developments in the field of education, so that it can draw upon the appropriate resources for all situations.

Activities. The activities of the E.C.O. will involve its interaction with learners, with teachers, with parents, with school boards, and with its total environment. The catalyst organization must identify those kinds of activities which will promote educational improvement and perform them to the satisfaction of all the parties involved. Its functions will include listening, talking, studying, observing, planning, assisting, motivating, structuring new situations to accelerate improvement, and demonstrating new ideas that are relevant to the educational systems with which it works. Specific examples of possible activities are presented in Section V, with illustrative discussions

in Appendixes C, D, and E.

Outcomes. The anticipated outcomes of the E.C.O.'s activities are educational improvements which are recognized as such, both by the catalyst organization itself and by the personnel from the other systems involved. Favorable outcomes should result in a continued demand for the catalyst's activities. As this demand increases, the function of the catalyst will be propagated throughout the educational community.

Information Processing. The information subsystem is central to the entire catalytic system. If the E.C.O. is to act quickly and effectively in the various situations in which it finds itself, it must have the information collecting and processing capabilities necessary for considering constraints, making predictions, choosing among alternatives, and comparing the outcomes with those predicted or desired. Only in this way can it bring the newest and best of educational developments to bear upon the problems of its clients.

The feedback of the results, both positive and negative, of the organization's catalytic activities is the major activity of the information component, and leads to a continuing and comprehensive evaluation of the various catalyst functions. Any new enterprise must be able to evaluate its own experiences in order to profit quickly from them; it must utilize continuing context evaluation to remain sensitive and responsive to the changing needs of consumers; and it must be ready to re-educate its personnel and modify its activities accordingly, in order to maximize its effectiveness.

External Environment. The external environment consists of all the other systems with which the E.C.O. can interact. It includes the educational systems which are the clients of the catalyst organization, Regional Educational Laboratories, R & D Centers, federal and state education agencies, and all developers of educational products or learning systems. The E.C.O. must train itself to consider all ideas or instructional systems extant in its environment as potentially useful to its clients. The catalyst

organization may identify requirements for innovative ideas and materials, but does not engage in product development itself unless this is essential to its catalytic function.

Improvement. The improvement component is as vital to the E.C.O. as it is to any educational system. If the catalyst organization cannot make effective use of its own improvement component, it will have difficulty in stimulating other organizations toward improvement.

As mentioned earlier, the key to continuing improvement is maintaining accurate feedback comparing the actual results of activities with the desired results. This allows both for modification of personnel assignments to relevant activities and for identification of new kinds of activities that will lead to more consistent attainment of those outcomes desired. An evolutionary operating procedure, utilizing information processing, feedback, and evaluation as appropriate, will minimize the chances of the catalyst organization's continuing on some self-defeating strategy, from which it may not recover.

V. What Should a Catalyst Do?

The preceding has been a relatively objective analysis of the current state of educational affairs and of the components essential to an educational catalyst organization. At this point, it may be difficult for the reader to visualize exactly the kinds of things that an E.C.O. or that an individual catalyst might accomplish. Since few agencies are actually performing catalytic activities, few people really know all those that could be performed.

It is doubtful that any E.C.O. will be as efficient or as enterprising as we would like to think. Such constraints as fund shortage, skill shortage, time shortage, and human nature will take their toll. Furthermore, each catalyst organization will be different from the others, and the exact nature of each will become apparent only as it evolves. But the objectives of all these organizations will be similar, and their general methodologies will

be parallel. The determination is necessarily a subjective one, and we call also on your imagination to design activities tailored to remedy the "unnovative" situations which you yourselves have experienced.

The following is a summary description of many of the activities that appear ideally suited to a catalyst organization (they all relate to the need to make improvements happen instead of waiting for accidents to happen). These activities are not listed in chronological order or in any order of priority.

- Continually studying the physical and attitudinal components of the environment and the local situation.
- Continually upgrading knowledge about technological advances, changes, innovations, and research findings.
- Communicating frequently with school staff, teachers, parents, school board, community members, PTA, and students in order to understand their feelings and to gain their confidence.
- Assisting the school staff in defining and clarifying objectives. (See Appendix C for illustrative example.)
- Interacting with school personnel to develop descriptions of strategies for educational improvement which can serve as communication devices.
- Assisting the school staff in determining the proper school organization.
- Directing the school staff, parents, students, and community toward the recognition of the improvement component in their educational system. (See Appendix D for illustrative example.)
- Identifying the most promising avenues for instigating desirable change.

- Considering the technique of "performance contracting" as a possible solution to some of the problems.

> . . . the Office of Economic Opportunity (OEO) [has] announced a more extensive experimental program aimed at solving the learning problems of the disadvantaged through... "performance contracting"...The OEO has contracted with six private firms to work with 27,000 students in eighteen school districts across the country...payment to the education firms will be contingent upon their success in improving student academic skills... Clearly, the continuing failure of the schools to deal adequately with the learning problems of the nation's poor provides a powerful stimulus for experiment and innovation.... And the resourcefulness of American business in solving complex problems offers an enticing model for schools in trouble... Fortunately, we have promise of a number of different laboratories in which to test the hypothesis that private educational agencies can succeed where the schools have failed.[15]

- Capitalizing on innovative successes by spreading the word, and putting models of the innovations in front of those others who could also use them. (See Appendix E for illustrative example.)

- Showing the school staff how to get additional assistance, if and when it is needed.

- Providing feedback so that the later selection and training of catalysts will be improved.

- Involving teachers, administrators, parents, and students, on as equal a basis as possible, so that they all take an interest from the start and none is likely to be a detractor.[16]

- Indoctrinating the school staff in the skills of decision-making, and relating timeliness to accuracy.

> At the present time teachers seldom have procedures as guidelines for decision-making.

. . . . . .

> All data relative to an issue are never available, and there is a practical point at which decisions must be made.[17]

- Staying particularly sensitive to the factor of cost of improvement, particularly where the locale involved is one of austerity or poverty.

- Accumulating expertise in the field of human relations and directing these skills into the realm of motivation of others.

- Assisting school staffs in planning new and improved facilities and plants. To avoid waste, these not only must be tailored for today's routines, but must be flexible enough to anticipate and accommodate tomorrow's change.

- Assisting in detailed and systematic planning for improvement, so that it can be accomplished comfortably and enthusiastically without frustrating upheaval.

> Attempts to impose change upon the school from without – from the district level – will probably not take root, while attempts to nourish change from within – at the classroom level – will probably be stifled by the greater weight of school routine. If change is to be brought about in American education, therefore, it must be brought about within the school as a total agency with a shared life.[18]

- Assisting the schools in attaining an open climate, a condition deemed more conducive to effecting improvements.

> ...the data indicated that highly innovative schools had open climates while less innovative schools had closed climates.[19]

- Devoting particular attention to motivating the principal, who is the prime influence on attitudes and on moving into innovation.

> The notion of the school as the basic organism of the educational structure leads to the second major hypothesis: change in education will become a way of professional life rather than an exception to the rule only if the official in charge of the individual school permits it. *The principal is the key agent of change.*[20]

- Obtaining an understanding of the variables, factors and characteristics involved in social change, in technological change, in organizational change, in curriculum content change, in teacher responsibility change, and in change of final objectives.

> A knowledge of *individual* factors affecting change cannot take us far toward understanding the change process or stimulating useful change in schools. Relationships among factors of change must be discovered and interdependences among variables must be identified to make more sense of the change process.[21]

- Being such an advocate of desirable change that the catalyst himself can readily change goals, processes, or activities to achieve improvements in the least time.

> ...so many of the present change strategies available seem to have so little evidence of actual accomplishment to support their claims. Even if this were not true, these strategies; whether they are labeled power-coercive, client centered, or rational-empirical; have either never gotten into the blood-stream of the school system or if they have, and this is probably more true of power-coercive strategies, have not cured the system of its ailments.
>
> [There] is another way of conceptualizing the change agent role in school systems....[and there] are new ways of conceiving of the relationships of outside educational agencies to school systems so that the change agent can have the support, working conditions and status to be effective while working from within. This agent can be most effective in enlarging and modifying expectations for change; introducing new elements into the system; sponsoring changes

himself, and, as a result, influencing both decisions and the decision-making process. While limits to the change agent's independence and freedom [exist], on balance, the role is believed worthy of continued study.[22]

- Preventing the random adoption of innovations, and fostering, instead, a systematic, organized approach, related to suitable context analysis.

  Context evaluation is necessary in identifying and assigning priorities to needs and in identifying and assessing alternative courses of action.[23]

- Educating the school staff, parents, community, school board, and students to anticipate, encourage and espouse continuing innovation rather than resist it.

- Providing for continual innovation, lest the expectation of improvement be lost or diverted.

  The only way to keep from falling into the trap of institutionally fossilizing innovative programs is to build a provision for continual application into change mechanisms.[24]

- Taking steps to create disequilibrium, and thus to instigate improvement. (School systems have two characteristics with regard to making changes: (1) the tendency to maintain themselves in equilibrium, and (2) the tendency of individuals in the system to resist change.)

  Studies of educational change show that it can take decades for proven innovations to be adopted by schools. This is understandable in light of the school's function as a social institution. As such, it tends to do what it has been established to do and to hold itself stable, resisting attempts at restructuring. In "systems" language, it maintains itself in a state of equilibrium and formalizes and routinizes its structures, processes, and the behavior of its members.

. . . . . .

> We are beginning to evolve strategies which can be employed to create disequilibrium and bring about planned change. Some of the most promising strategies approach the system from the outside by creating temporary new systems that cause people within the system to look outward for new ideas. We are also beginning to realize that strategies can be designed within the permanent system itself for creating disequilibrium.
>
> Creating disequilibrium is similar to many other activities – a little bit goes a long way. A state of extreme disequilibrium within a system (i.e., conflict between subsystems) impedes planned change as much as does a state of equilibrium.[25]

- Encouraging schools to emulate the catalyst's processes, so that they develop a capacity for problem-solving, becoming, to some extent, their own agents of improvement, and so that the catalyst can move on to other areas.

We can think of still more catalytic activities, and no doubt the reader can, also. But the picture is clear: the individual catalyst is a person who can walk on water. If he can't, he'd better learn how!

Where does such a person come from? How is he trained? How is his assignment engineered? Who pays him? These questions are easy to ask, and impossible to answer accurately. But we do have some thoughts on how they might be answered by an Educational Catalyst Organization, as well as some thoughts about the problems that will need to be solved enroute. To the extent that we can verbalize these thoughts, they are covered in succeeding sections.

VI. How an E.C.O. Works

Applications of recent educational findings or innovative ideas can involve either

...problems in search of a solution, or solutions in search of

appropriate problems. In the former case the sequence appears somewhat as follows:

> (1) Motivation in the form of some want or problem to be solved; (2) Conception and development of an idea to satisfy the want or meet the problem, preferably with practicable levels of resources; (3) Critical review, tryout and evaluation leading to either extinction or strategies for dissemination to different kinds of identified potential adopters in ways likely to induce receptivity as well as awareness; (4) Modification to transfer demonstration from a nurtured environment to non-nurtured environments, thereby leading to continuity, spread, spin-off, spillover...or extinction; (5) Further assessment and continued search for improvement or adaptation to changing circumstances.

When solutions seek problems, the steps of the sequence appear more like the following:

> (1) Identification of a superior innovation, invention, improvement or solution to a problem, with seeming potential for wider application or at least broader tryout; (2) Identification of the market or potential users of the innovation; (3) Change-agent linkage between the innovator system and the client or potential user system to facilitate critical review, tryout and evaluation in ways likely to induce receptivity as well as awareness; (4) Modification, refinement and study of what may be needed to transfer demonstration from a nurtured environment to non-nurtured environments, thereby leading to continuity, spread, spin-off, spill-over...or extinction; (5) Further assessment and continued search for improvement or adaptation to changing circumstances.[26]

The educational catalyst organization, in its dealings with its clients, will run across a number of problems looking for solutions. However, as it will possess the latest information on ways to accelerate educational improvement, it will most frequently find itself in the position of having solutions and identifying the problems to which to apply them. Identification of potential users for its innovative ideas will thus provide it with its clients, and the individual catalyst will provide the change-agent linkage between its clients and the E.C.O. Continuing modification and search for improvement, through the feedback

received on the E.C.O.'s activities, will assure the continuing life of the organization as an instrument of innovation and advance.

The actual implementation of an E.C.O. posits certain requirements, some few of which will be discussed below. Such considerations as specific organizational structure and support functions are also necessary but will not be treated in detail in this paper.

Background. Some valuable research has already been done on the instigation of educational improvement.

> ...It appears highly likely that means can be developed for predicting and affecting the diffusion of innovations. More specifically, it appears possible to identify, and perhaps develop, groups and individuals who are more likely than others to be effective in the transmission and adoption of innovations resulting from research programs. It appears possible to identify, and perhaps to affect, contextual variables which enhance or inhibit the transmission and adoption of the innovation resulting from research programs. It appears possible to identify the characteristics of information systems which might play a role in enhancing or inhibiting the adoption of innovations. It also appears possible to identify those characteristics of innovations which enhance or inhibit their adoption.[27]

These opinions are corroborated by the findings of a study undertaken by a member of the staff of the Southwest Educational Development Laboratory.[28]

Prior to initiating its own operations, a catalyst organization should study the experiences of those persons and organizations already engaged in catalytic activities. These would include educational consultants, supervisors in schools, Intermediate Service Centers to Schools, state education agencies, Regional Educational Laboratories, and such organizations as I/D/E/A, the National Institute for the Study of Educational Change (NISEC), the Center for the Advanced Study of Educational Administration (CASEA), and the Cooperative Project for Educational Development (COPED). With the information thus gathered, a

new E.C.O. should be able to determine qualifications for prospective personnel and identify the kinds of activities in which they will be engaged and the kinds of improvements they may be instigating.

It is important to recognize that a catalyst organization can start out on a very small scale, expanding as the demand for personnel, and their availability, increases. The organization should be able at all times to expand and contract quite easily, as will be explained in the discussion of the personnel management system.

Training. Personnel entering the E.C.O. should be given appropriate training to ensure that they understand the concepts basic to the catalytic function. All individual catalysts should be given a common operating model for the function they are to perform, which will be augmented as experience is gained in the field and fed back into the organization's information system. The basic training package created for catalyst personnel should yield such outcomes as:

- Recognition of the importance of providing a conceptual model for all personnel of educational systems, to aid in accelerating improvement.
- Ability to describe the components of an educational system.
- Ability to aid another person who is developing a relevant description (model) of an educational system.
- Knowledge of the importance of allowing for various degrees of clarity in educational objectives.
- Knowledge of the importance of increasing clarity of objectives as a prerequisite for educational improvement.
- Understanding that one instructional method is not always the best for all learners. The individual catalyst cannot be

committed to any particular learning system.

- Realization that the principles of modifying the behavior of students (young learners) are also useful for teachers, parents, administrators, and other adults. The improvement of education for the students is accelerated through improving the capabilities of the adult members of the educational system.

- Ability to use effectively the principles of behavior that are valuable in personnel interaction.

This very fragmentary list should be extended and updated continuously as the catalyst training package continues to develop and evolve. The specific activities of the individual catalysts will differ, but the overall modus operandi of the organization should be based on well-established fundamentals.

Personnel Management. A personnel management system is essential to a catalyst organization, and is the organization's most critical function involving people. To remain responsive to its experiences, an E.C.O. must develop effective ways of (1) identifying and training quality personnel; (2) discovering and delineating new activities to be performed; (3) maintaining a continuing flow of information between the individual catalysts and the external environment; and (4) analyzing the effectiveness of the personnel and of their actions. Thus, the management system must be implemented and must meet certain requirements.

Personnel in a responsive catalyst organization cannot be job-typed, hired, and pigeonholed as in a production-oriented operation. While the jobs of the support personnel (clerks, typists, computer operators, etc.) may be easily specified and may remain static, those of the catalyst personnel must be viewed in a different light. Catalyst personnel will be selected from the totality of innovative and change-agent types available to the organization, and given their assignments for the sole purpose of improving educational systems. Consequently, they will comprise

many different types of people – university faculty members, master teachers, computer specialists, management experts, finance specialists, etc. Some of them will work with the E.C.O. full-time, and some will perform varying amounts of part-time activity.

Personnel-Characteristics Information is required for any decisions concerning the assignment of personnel to specific catalytic activities. This information should include a person's home location, the percentage of time he is available, his other affiliations and commitments, his educational background and areas of expertise, his public speaking abilities, his fluency in any foreign language, and any other items deemed significant to the personnel assignment system. (Probably personality characteristics will also be an important element.) The data array should be adequate, but should not contain information which is irrelevant to required personnel decisions. The information will be updated as new personnel become available and existing personnel characteristics are modified through training experience and continuing information flow.

Activities-Properties Information must also be collected, indicating the catalytic activities to be undertaken and the properties that are relevant to assignments of personnel to each activity. These properties should correlate insofar as possible with the categories established for Personnel-Characteristics Information, so that the matching of personnel to activities can be performed quickly and expediently by computer. The Activities-Properties Information, too, will be updated as new activities are identified and new information is obtained about the existing activities.

It should be noted at this point that computerized assignment of activities will only be effective if tempered with common sense. Some personnel characteristics, as well as some properties of activities, are intangible, and an effort should be exerted to see that the catalyst personnel are basically compatible with, and at ease in, the educational milieu into which they are sent.

An Effectiveness Indicator should be used to determine whether the functioning of the E.C.O. is resulting in an acceleration in educational improvement, recognized by both the catalysts and the clients. To make this determination, and to estimate the extent of any acceleration, the effectiveness of the E.C.O.'s activities as performed by its personnel must be measured in some manner. A simple rating scale (for example, one to five) could serve to indicate both the predicted and the observed effectiveness of each individual catalyst in each activity in which he engages, or another means of measurement could be used. A comprehensive evaluation system is essential to provide continuing feedback on the overall performance of the organization, but no system should be allowed to become so complicated that it is abandoned.

The ultimate goal of assigning individual catalysts to particular activities is to maximize the effectiveness of the entire E.C.O. To this end, new people with desired characteristics are hired; personnel already in the system are informed of new ideas and trained in their implementation, thereby modifying their characteristics; new catalytic activities are identified; and the properties of the new activities are analyzed and defined. It is essential to the survival of the E.C.O. that precisely the right person be placed in a particular situation, and all its hiring and training procedures should be directed toward that end. This is why the personnel management function is the most vital of all the organization's functions, and why it should be activated by the best and most current .information available on the promotion of educational improvement.

Support Functions. While the usual support functions (finance, supply, etc.) are required in an E.C.O., the primary support element for the organization is the information system, with particular emphasis on new ideas and new educational products. The information retrieval personnel should be closely linked with the operational personnel, since information is one of the main requirements of individual catalysts in the field. Here, again, continuing feedback on the ongoing activities is of extreme importance.

Not only should information be made available, but specific training should be given as necessary for updating the capabilities of the catalyst personnel. If IPI, for example, or the CEMREL mathematics program is potentially relevant to future catalytic activities, then training in these areas should be provided to selected personnel. Continuing information and training are more vital to catalysts than to personnel engaged in product development. Product developers work on a particular product over an extended period of time, and can afford to concentrate all their efforts on the product in question. Catalysts, however, must be aware of a wide variety of products and ideas which might be useful to their clients.

Personnel services involving payroll, social security, insurance, etc. should be separated from the personnel development and information flow functions in a catalyst organization.

Attainment of Objectives. How does a catalyst organization recognize the extent of attainment of its objectives – the improvement of educational systems? The E.C.O. is similar in some respects to a management consulting organization (except that its clients will have less money). It is promoting anything that will facilitate educational improvement – ideas, products, management techniques, etc., and its positive effects must be recognized and promoted by its clients as well as by its own personnel in order to insure continued demand for its services.

Recognition of the value of services performed generally comes more easily if something is paid for those services. If two different groups engage in an activity with a client, one paid and one unpaid, then any good results of the activity are likely to become identified with the group to whom the client has made payment. While an E.C.O. will probably have other sources of funds, it should make some direct charge, even if a nominal one, to its clients for the services it performs for them.

Non-monetary recognition is also very important for many people, and it is certainly necessary for broadening the demand for catalyst activities. The work of the E.C.O. is such that its

clients will generally receive the credit for implementing the innovations it introduces, and some attention must be given to promoting its own resources and the capabilities of its personnel.

This is an extremely important problem and it is the key to the ultimate survival of a catalyst organization. The problem is complicated when federal funds are involved and the source of payment is far removed from the clients with whom the organization actually works. All possible efforts should be made to obtain public recognition for the E.C.O.'s activities, using all the contacts and all the avenues available to it in the educational world. Clients must be persuaded to endorse and to recommend the organization, and its own public relations function must be active and sophisticated. Instructional advertising and the submission of articles to various educational journals will be helpful, but the continuing creation of goodwill through comprehensive and effective services is the most essential concern of the E.C.O.

A conference on Educational Change Agent Training, held May 25-27, 1970, in Clinton, Michigan, was attended by one of the authors of this paper. Materials from this conference, which treat the subject more extensively, are included in the list of supplementary references. These references include discussions of all aspects of change-agent concepts and activities.

VII. Implications for Regional Educational Laboratories

> We need to build a secure base for the linker, a permanent institution which includes a mix of interdependent complementary linking roles....We must make certain that these roles are not only included but are coordinated by a director who appreciates the need and importance of each role and is motivated to work hard at bringing them together.
>
> This linking institution could be based in a university or a school system but neither of these alternatives is entirely satisfactory. An independent base not identified with either the research world or the practice world is probably preferable. In any case the institution will be expensive to operate if it is to be an effective linker and will, therefore,

require federal support either directly or indirectly through contracts and grants to universities, school systems, *and* commercial firms....Eventually, in the not too distant future, the government should come up with an overall plan for an educational extension service which includes well-defined linking roles at various levels. Furthermore, it should not shy away from coordination of state and regional services to reduce redundancy of effort and to insure that knowledge packages and programs developed in one area are effectively diffused throughout the national extension system.[29]

Recently, there have been organized efforts to promote catalytic activities on the part of such groups as Title III Centers, state departments of education, and university faculties. Among the Regional Laboratories as well, there has been some attempt to assist educational institutions to adopt improved practices and use them effectively. "Several Laboratory programs are lessening the need for each school to 'reinvent the wheel' and reducing the costs of implementing innovation."[30] Laboratories currently functioning to some extent in a change-agent capacity include the Center for Urban Education in New York City, the Far West Regional Educational Laboratory in Berkeley, the Southwest Regional Laboratory in Los Angeles, the Regional Educational Laboratory for the Carolinas and Virginia in Durham, The Northwest Regional Educational Laboratory in Portland, the Eastern Regional Institute for Education in Syracuse, Research for Better Schools, Inc. in Philadelphia, and the Educational Development Center in Newton, Massachusetts. For example, the Educational Development Center cites as its mission:

> To create improved systems of inservice education in urban schools through:
>
> Instructional Resource Teams, trained in social and educational change, that provide background for educators, parents, and community groups in sensitivity, curriculum development, teaching techniques, child development, administration and supervision, and efficient distribution of teaching materials.[31]

34

To accelerate the adoption of improved educational practices from all sources, intensive catalytic activities should be undertaken by some of the Regional Laboratories. Such an undertaking could be facilitated by the proposed National Institute of Education.

> ...the NIE...would train researchers through fellowships and traineeships; serve as a focus for research throughout the government; and "build on and add strength to the present national system of educational Laboratories and R & D Centers."[32]

Research conducted by the NIE could yield findings to be implemented by the Laboratories, and by other catalyst organizations, in their pursuit of educational improvement.

While the problem focus of some of the Laboratories is purely regional, that of others is nation-wide. Still others divide their efforts between local and national educational affairs. It will be easier for the Laboratories with at least some regional focus to develop catalyst components, since they will be able to observe their potential clients more closely and more constantly, and will have a more intimate understanding of their particular problems. If a Laboratory has already established itself as being primarily a catalyst organization, it should continue with this endeavor and increase its efforts. A Laboratory which incorporates catalyst activities will have an especially strong base from which to operate within its region, since these activities will render it more responsive to its environment.

Some Laboratories may choose to continue devoting their full time to the development of instructional products, or learning systems, and to concentrate their diffusion efforts on their own products. This strategy will ensure the continuing availability of improved products to the catalyst organizations and to the entire educational community.

Several of the Regional Laboratories may wish to engage in both product development and catalyst activities. This is a logical combination, since the contacts made through product testing

will be useful in marketing catalyst services and, conversely, a Laboratory that develops a catalyst component increases the opportunity for exposure of its own products. It is important to keep the development and catalyst operations separate, even while sharing standard support functions. This separation is necessary because a catalyst component of a particular Laboratory should receive input not only from the product development component of that Laboratory, but also from numerous other sources.

Another reason for separation of the product development and catalyst activities is that the mode of operation of the catalyst personnel will be quite different from that of the product developers. The latter may be required to keep aloof from the Laboratory's field operations, but the catalysts must continually introduce themselves into potentially hostile educational systems, and the same people may or may not be effective in both capacities.

A catalyst function within a Regional Laboratory can be evolved with a relatively small financial outlay, and feedback on the effectiveness of the function will begin immediately. As the demand for catalysts increases, the supply of full-time or part-time catalyst personnel can be cultivated accordingly. Product development, on the other hand, requires more full-time personnel, more money, and longer periods of time for the results to manifest themselves. Substantive feedback can scarcely be obtained in less than three years, and if the product does not sell it is very difficult to divert efforts to the development of another product. It is true that the results of catalyst activities may be more difficult to sell than tangible products, but their payoff to schools is potentially far greater than that of product development. In time, the catalyst services of a Laboratory could become as valuable as its products, if not more so. The Laboratories should thus make initial contact with all the actual or potential innovators and change agents of their respective regions and ascertain what these people, or organizations, will be able to contribute to the catalytic function. They may consider employing some of these people, or using them as consultants, but they

should know all the capabilities available to them, and maintain records on these capabilities through their personnel management systems.

It must be remembered that the Regional Laboratories are in competition with one another; they must cooperate to survive, but they must also compete to survive. The optimum mix of cooperation and competition will have to be maintained in catalyst activities as well as in product development. If several Laboratories develop catalyst organizations, the resultant competition should improve the efficiency of all these organizations and accelerate improvement of education. The growing concern with dissemination and diffusion will be applied to catalyst services in addition to products, and the efforts of the various Laboratories in this direction can be consolidated to develop a comprehensive and effective system for promoting the best of educational innovations throughout the country.

It is now time for some of the Regional Laboratories to instigate the process of catalytic diffusion. Such an action will be of inestimable value both to the other Laboratories and to education nation-wide, and the Laboratories performing it will become the focus of development of the whole improvement and change process. These Laboratories could well be the catalyst that improves American education significantly.

VIII. Summary and Conclusions

We have tried to indicate that good and useful research is being done throughout the educational domain, but that a large part of the good things learned in this research are not brought to the fore, and certainly are not being adopted at what would seem to be an appropriate rate. The main problem, then, in getting things moving in education appears to be providing calculated measures to bridge the gap between the conception of good ideas and their installation where they will be most useful.

The fact that good, innovative products are being turned out by the R & D Centers, by the Regional Laboratories, and by many other development organizations does not in itself guarantee any adoption or any use of these products. We have identified some of the diffusion methods that have been tried, have examined them briefly, and have discovered built-in shortcomings. Other endeavors, in this country and elsewhere, that have used the change agent method have produced enviable results, and the logical conclusion is that a well-organized and well-directed change agent (or catalytic) effort would be equally successful in education.

Repeated and time-worn efforts to disseminate educational improvements in a general manner have more often than not resulted in general failure. The fact of the matter is that routine dissemination and even high-powered diffusion frequently produce but meager results and certainly do not relate the correct solutions to the existing problems.

One of the key factors in facilitating educational improvements is introducing the right solution at the right time and providing systematic planning that is adequate to solve the problems at hand. Many changes are being instigated where no problem exists and many solutions are being provided that are wrong for the problem in question.

In their haste to appear innovative and to keep things moving, many responsible administrators are making changes just for the sake of change. Certainly there is an advantage in promoting continuing progress and in acclimating the whole environment to the process of change. But considering the many specific problems that currently exist, it should be possible to find improvements for these problems rather than making random changes.

The change agent technique has proven successful in several of our country's major endeavors, both within our borders and overseas. Not unexpectedly, the change agent technique in education has usually proven successful, when it has been used at

all. It follows, then, that a well organized, well trained, and properly supported educational change agent organization could prove to be the missing link for which so many professionals have been looking for so long.

The processes of obtaining, training and developing, and placing the educational catalyst need to be developed, tried out, and then implemented on an appropriate scale. There are many unknowns in these processes, and the only way to pinpoint them and solve them is to start down the road and let the organization and process evolve.

The operation of an educational catalyst organization probably requires a special mixture of skills and techniques. While the end objective is to attain optimum improvements in education, the training and skills necessary to accomplish this are not entirely educational in nature. Personnel management is probably the most crucial function of an E.C.O., followed closely by that of information processing. The information function may be accomplished manually or partly by machine, but not all information processing of this type can be computerized.

With the establishment of the National Institute of Education, it would seem that the work of the R & D Centers will, appropriately, be focused on matters that need further study. This would make the Regional Laboratories the most likely structures to involve themselves deeply and comprehensively with the catalyst function.

There are other university sponsored and commercial organizations doing work similar to that of the Laboratories, and these organizations could also be important in developing catalytic procedures and methodology.

There is sufficient evidence that some form of catalyst or change agent organization will be the precipitant that will get things moving in American education. There is no need to wait longer to determine if, or how, or where, or why this should be

done. Educational Catalyst Organizations should be established, now.

> It is not simply that we do not know which goals to pursue....The trouble lies deeper. For accelerating change has made obsolete the methods by which we arrive at social goals.[33]

> We can no longer afford to approach the longer-range future haphazardly. As the pace of change accelerates, the process of change becomes more complex. Yet at the same time, an extraordinary array of tools and techniques has been developed by which it becomes increasingly possible to project future trends - and thus to make the kind of informed choices which are necessary if we are to establish mastery over the process of change.[34]

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29. Ronald G. Havelock (in collaboration with Alan Guskin, Mark Frohman, Mary Havelock, Marjorie Hill, and Janet Huber), *Planning for Innovation: A Comparative Study of the Literature on the Dissemination and Utilization of Scientific Knowledge,* Final Report, Project No. 7-0028, Contract No. OEC-3-7-070028-2143, ED No. 029171, U. S. Department of Health, Education and Welfare, Office of Education, Bureau of Research (Ann Arbor, Michigan: Center for Research on Utilization of Scientific Knowledge, Institute for Social Research, The University of Michigan, July 1969), pp. 7-38.

30. Frank A. Schmidtlein, "The Programs of the Fifteen Regional Laboratories," *Journal of Research and Development in Education,* Vol. III, No. 2 (Winter 1970), pp. 26-27.

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32. *Education Daily,* Vol. III, No. 32 (February 17, 1970), p. 3. (Quotes from speech by Assistant HEW Secretary for Education James E. Allen, to American Association of School Administrators convention meeting in Atlantic City, New Jersey.)

33. Alvin Toffler, *Future Shock* (New York: Random House, 1970), p. 404.

34. Richard M. Nixon, Statement Upon Announcing the Establishment of the U. S. National Goals Research Staff Within the White House, July 13, 1969. Quoted in *Toward Balanced Growth: Quantity with Quality,* Report of the U. S. National Goals Research Staff (Washington, D.C.: U. S. Government Printing Office, July 1970), p. 99.

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Havelock, Ronald G., Huber, Janet C., and Zimmerman, Shaindel (compilers). *Major Works on Change in Education: An Annotated Bibliography with Author and Subject Indices.* Ann Arbor, Michigan: Center for Research on Utilization of Scientific Knowledge, Institute for Social Research, The University of Michigan, October 1969.

Havelock, Ronald G. (in collaboration with Alan Guskin, Mark Frohman, Mary Havelock, Marjorie Hill, and Janet Huber). *Planning for Innovation: A Comparative Study of the Literature on the Dissemination and Utilization of Scientific Knowledge.* (Final Report, Project No. 7-0028, Contract No. OEC-3-7-070028-2143, ED No. 029171, U. S. Department of Health, Education, and Welfare, Office of Education, Bureau of Research.) Ann Arbor, Michigan: Center for Research on Utilization of Scientific Knowledge, Institute for Social Research, The University of Michigan, July 1969. (This source is also listed in footnote 29.)

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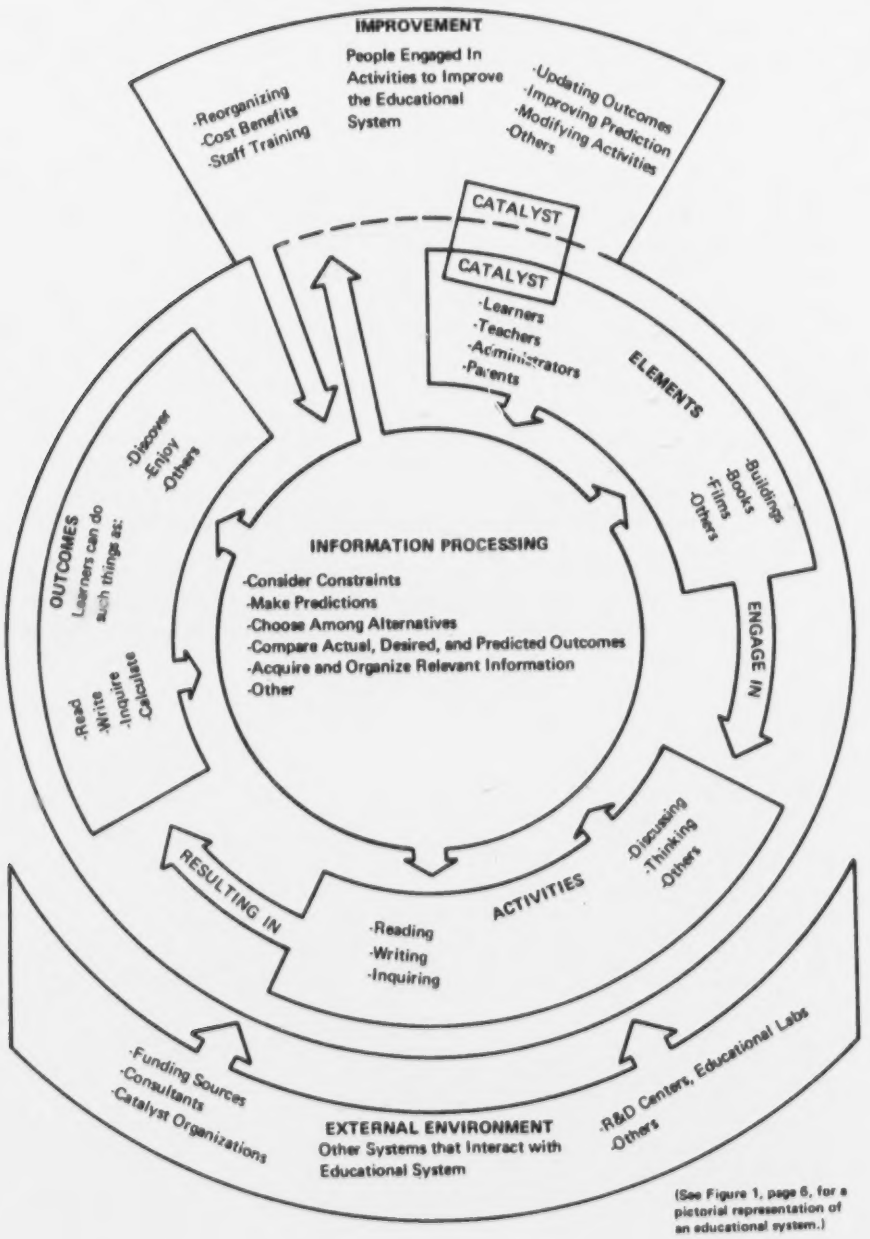
APPENDIX A

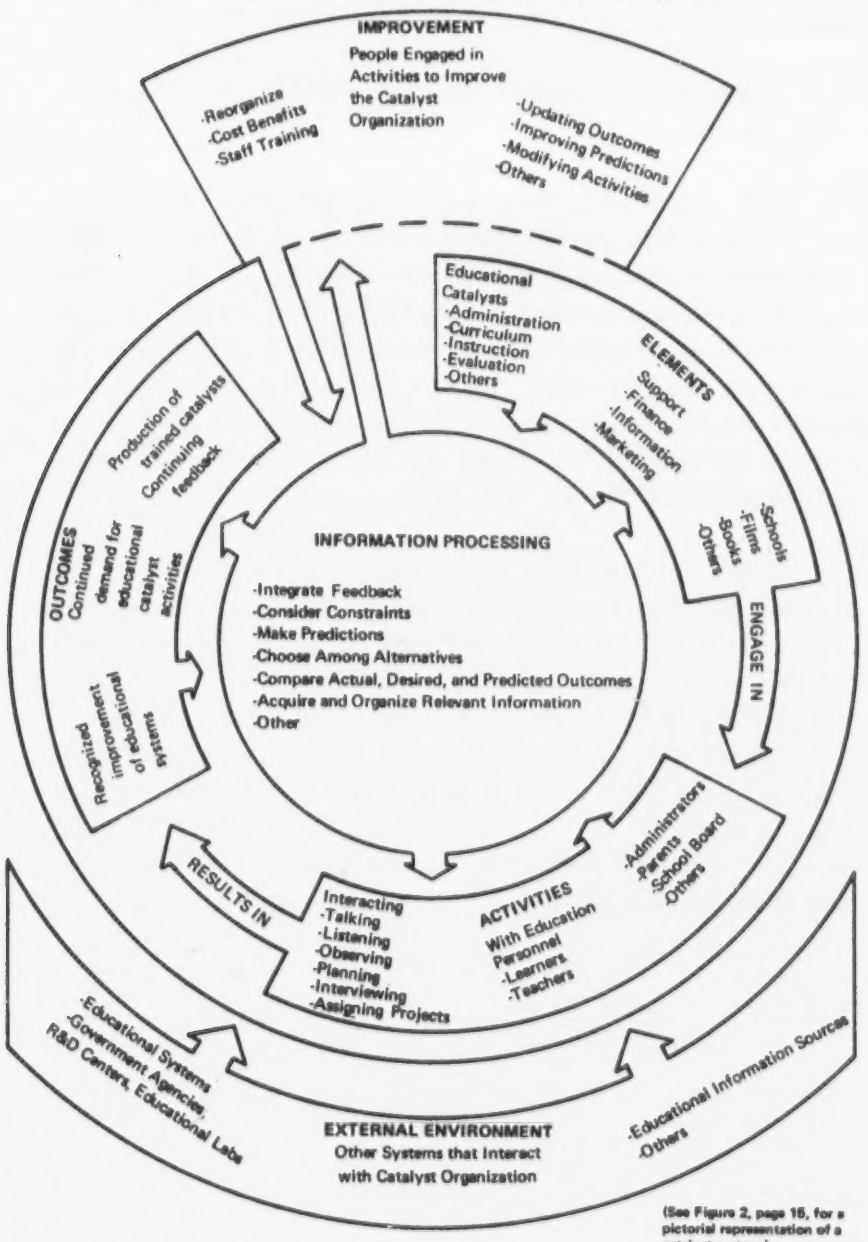
COMPONENTS OF AN EDUCATIONAL SYSTEM



(See Figure 1, page 6, for a pictorial representation of an educational system.)

APPENDIX B

COMPONENTS OF AN EDUCATIONAL CATALYST ORGANIZATION (OR SYSTEM)



(See Figure 2, page 16, for a pictorial representation of a catalyst system.)

APPENDIX C

Illustrative example of activity described on Page 19.

- Assisting the school staff in defining and clarifying objectives.

One of the problems encountered in the definition and clarification of objectives of the educational system is the common assumption by school personnel that *each* and *every* objective must be specified in equally clear and measurable terms. Certainly they should all be as clear as possible, but in some cases complete clarity may not be feasible. Since there are some fields in which desired outcomes are affective and therefore are difficult to measure (attitudes, appreciation, etc.), these objectives must be defined in "fuzzy" terms.

The catalyst can help school personnel recognize the dual nature of objectives, and can help them understand that (1) it is more important to define clearly and in behavioral terms objectives that are essential prerequisites to other outcomes; (2) some objectives are easier to define than others; (3) some objectives in the affective domain cannot be clearly defined or measured; (4) there is nothing wrong with having "fuzzy" objectives mixed in with clear ones; and (5) acceptance of the desirability of clarifying objectives will aid in the effort to describe the fuzzier ones as clearly as possible.

APPENDIX D

Illustrative example of activity described on Page 19.

- Directing the school staff, parents, students, and community toward the recognition of the improvement component in their educational system.

Teachers, parents, learners and administrators usually take action to change an educational system only when things get bad. Such changes frequently result in traumatic effects on the system. This situation occurs because systems improvement has not been recognized as a necessary component in education. A teahcer, or parent, or learner who dares make a suggestion about changing some aspect of the system usually receives some form of punishment in an effort to extinguish the *suggestion behavior.*

Effective organizations in any field must adopt a philosophy of improvement as a way of life in order to survive and to extend their influence. The catalyst must create within the educational community the attitude that continued modification and improvement are both good and essential to the schools. The source of impetus for improvement can be internal, external, or both.

APPENDIX E

Illustrative example of activity described on Page 20.

- Capitalizing on innovative successes by spreading the word, and putting models of the innovations in front of those others who could also use them.

School district X has developed an adequate description (model) of its own educational system, and has begun to pursue some new approaches to its problems. At this time, it seems appropriate to examine the strategies of another, exemplary school system. An educational catalyst helps school district X personnel to identify a junior high school possessing the properties of the junior high system desired by school district X. School district X then sends students, teachers, parents, administrators, and school board members to "live" in the model school for two days. The students and teachers from school district X are matched with similar students and teachers in the model school, while the parents, administrators and school board members engage in various relevant activities throughout the two days.

The result of this visit is to give all personnel elements of school district X a common model for some of the educational improvements to which they aspire. If *only* the teachers, or *only* the administrators, in a school district have such experiences, then there is little change for interaction to occur throughout the district because there is no common model to serve as a communication medium.

OCCASIONAL PAPERS *

1. THE PROBLEM AND PROBLEM DELINEATION TECHNIQUES – William J. Gephart, Phi Delta Kappa. Presented at the Second National Symposium for Professors of Educational Research, sponsored by Phi Delta Kappa, Boulder, Colorado, November 21, 1968.

2. A REVIEW OF INSTRUMENTS DEVELOPED TO BE USED IN THE EVALUATION OF THE ADEQUACY OF REPORTED RESEARCH – Bruce B. Bartos, Phi Delta Kappa & Indiana University. Presented at the Annual Meeting of the American Educational Research Association, February 1969, Los Angeles, California.

3. PROFILING EDUCATIONAL RESEARCH – William J. Gephart, Phi Delta Kappa, January 1969.

4. APPLICATION OF THE CONVERGENCE TECHNIQUE TO READING – William J. Gephart, Phi Delta Kappa, January 1969.

5. THE CONVERGENCE TECHNIQUE AND READING: A PROGRESS REPORT – William J. Gephart, Phi Delta Kappa. Presented at the Annual Meeting of the International Reading Association, May 2, 1969, Kansas City, Missouri.

6. THE EIGHT GENERAL RESEARCH METHODOLOGIES: A FACET ANALYSIS OF THE RESEARCH PROCESS – William J. Gephart, Phi Delta Kappa, July 14, 1969.

7. PROFILING INSTRUCTIONAL PACKAGE – William J. Gephart & Bruce B. Bartos, Phi Delta Kappa; August, 1969.

8. EDUCATIONAL KNOWLEDGE USE – Gene V Glass, Laboratory of Educational Research, University of Colorado.

9. MEASUREMENT AND RESEARCH IN THE SERVICE OF EDUCATION – Warren G. Findley, Research and Development Center in Educational Stimulation, University of Georgia.

11. DISSERTATION YOU MAY WANT TO SEE – William J. Gephart, Phi Delta Kappa, 1970.

12. THE DOCTORATE IN EDUCATION IN CANADA – Neville L. Robertson, Commission on Higher Education, Phi Delta Kappa, 1971.

*Price list available upon request.